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NMR&D News is an authorized publication of the Naval Medical Research Center, 503 Robert Grant Avenue, Silver Spring, MD 20910. *NMR&D News* is published monthly by the NMRC Public Affairs Office, 301-319-9378, 301-319-9425 or [click here](#) to email us.

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Rear Adm. Gillingham Addresses NMRC

By Rear Adm. Bruce Gillingham, Navy Medicine West



It has been said history is littered with the remnants of organizations that fail to adapt to their changing landscape, and today the Military Health System's (MHS) landscape is undergoing one of the greatest transformations in its history. With this in mind, Navy Medicine is adopting better ways of doing business through the *Reinvention* initiative.

While some may couch the *Reinvention* as a mere reorganization, this couldn't be farther from the truth. The reality is that as a high reliability organization, we must master the art of adaptation. As such, the ability to modify the way we do business to meet the changing demands of current and future landscapes is the key to our success, which is what the *Reinvention* is about

The *Reinvention* involves the alignment of NMRC and enterprise laboratories under the umbrella of Navy Medicine West — an umbrella of advocacy and support creating new opportunities for process improvement, increased capabilities, and greater visibility of the research and development enterprise.

Navy Medicine's successes, both in the field and at the bedside, have been built on the bedrock of your outstanding research and development efforts. As your new senior commander, I salute your dedication to our shared mission, and I look forward to helping you continue your legacy of excellence.

NMRC Commanding Officer Message



We have all heard the famous quote from the pre-Socratic Greek philosopher Heraclitus, “the only thing that is constant is change.” After 25 years of service I can say that quote holds true for Navy Medicine whether it is in our research commands or the military treatment facilities and other health care settings and organizations. We lead from the front to make sure our methods to conduct sound research and development are well established yet flexible, along with ensuring Navy Medicine’s clinical care delivery model, clinical practice initiatives, and administrative processes are as innovative as possible. As part of the Bureau of Medicine and Surgery’s *reinvention* process, the Navy Medicine Research & Development enterprise will greatly benefit from the changes ahead.

I was not alone in the excitement I felt August 1st as our laboratory enterprise officially reorganized under RDML Gillingham’s leadership to Navy Medicine West. As Admiral Gillingham reminds us, mastering the art of adaptation is crucial as we strive to adopt the tenants of a high reliability organization (HRO). While much of what has been written on HRO’s lately seems to be hospital or patient-care centric, the traits are easily adapted to a research and development organization and will lead to a reduced risk to human and animal subjects and a reduced bureaucratic burden in terms of research administration. As part of an HRO we need to be reluctant to accept easy or simple explanations for problems and look deeper for solutions. We need to defer to expertise rather than hierarchy or seniority and to strive for resilience, to improvise quickly and remain persistent and focused on our goal of supporting the warfighter. I think you’ll agree that while this approach can lead to successful outcomes as a business model, they are perfect fit for an R&D organization.

Please join me in embracing these changes as we continue to move our organization forward under the leadership of Navy Medicine West.

**NMRC Commanding Officer Sends,
Jacqueline D. Rychnovsky, CAPT, NC, USN**

NSMRL Commanding Officer Message

Greetings from Naval Submarine Medical Research Laboratory! I have been in command about three months now and cannot express enough how proud I am to be serving with the World’s experts in Undersea Medicine! NSMRL was created in the 1940’s and its initial charter was to develop procedures to select and train submarine sonar operators. The mission was expanded to include selection and psychologic screening of submariner candidates. Since these early days, NSMRL has enjoyed an impressive record of accomplishments including development of standards for color and night vision, the Farnsworth Lantern test (FALANT), discovery of the medial OlivoCochlear reflex (which predicts hearing loss), procedures and equipment to escape from a disabled submarine, saturation diving decompression tables, medical studies for the integration of women into the submarine force, ironclad proof of the harmful effects of second-hand tobacco smoke, and methods assessing tactical team performance. NSMRL was integral to the support of SEALAB, the underwater habitat which proved the concepts of long term saturation diving. Of recent note, NSMRL was designated the Submarine Force’s Human Performance Laboratory. I am continually impressed by the level of professionalism of the people at NSMRL. They are a virtual who’s who list of award recipients! From Ms. Lorraine Nudd (R&D Comptroller of the Year), to Dr. Paul Weathersby (UHMS Dr. Behnke Lifetime Achievement Award) to Dr. Lynne Marshall (Dr. Deloris Etter Top DoD Scientist of the Year Award) to Dr. Jeremy Federman (DoD and DoN Audiologist of the Year) to Dr. Michael “Q” Qin (Dr. Edward Cudahy Scientist of the Year Award), to HM1 John Connors (R&D Sailor of the Year), to our Research Dive Team which is constantly faced with solving fringe diving problems and pushing the envelope of human performance. Our group of contractors, engineers, and research assistants are amongst the finest group of professionals I have had the opportunity to work with, and because of them I am a better person.



I am the most fortunate Commanding Officer in the Navy and look forward to the future. HOOYAH!

**NSMRL Commanding Officer Sends,
Fred Yeo CAPT, MC, USN**

NAMRU-6 Gets New Commanding Officer

Story by Lt. Cmdr. Craig Stoops, NAMRU-6 Public Affairs



(Left to right) Ambassador Brian Nichols; former Naval Medical Research Unit No. 6 (NAMRU-6) Commanding Officer, Capt. Kyle Petersen; new NAMRU-6 Commanding Officer, Capt. Adam Armstrong; and, Naval Medical Research Center Commanding Officer, Capt. Jacqueline D. Rychnovsky cut the cake at the NAMRU-6 Change of Command Ceremony, Aug. 6. (Photo courtesy of NAMRU-6 Public Affairs)

LIMA, Peru, -- Naval Research Unit No. 6 (NAMRU-6) Commanding Officer, Capt. Kyle Petersen was relieved of command by NAMRU-6 Executive Officer, Capt. Adam Armstrong during a change of command ceremony held Aug. 6.

Ceremony attendees included the Honorable Brian Nichols, U.S. Ambassador to of Peru; Rear Admiral Rafael Zariquiey, Health Director of the Peruvian Navy; Capt. Jacqueline Rychnovsky, commanding Officer of Naval Medical Research Center (NMRC); and, numerous distinguished members of the Peruvian and U.S. militaries, and the Peruvian medical research community and families.

During the ceremony Petersen addressed the attendees with remarks saying it was the “outstanding people who make the Command great.”

Having served both as Executive Officer and Commanding

Officer of NAMRU-6, Petersen was presented a plaque from the Peruvian Navy, a decorative table and a paddle from the Peruvian staff for his service as commanding officer.

Petersen and his family will be moving to Maryland where he will be joining the faculty at the Uniformed Services University.

“[I am] humbled [to be] taking command of such a great institution,” said Armstrong. “Capt. Petersen [has given me] a great ship and a great crew.”

NAMRU-6 will continue to serve as a resource for the development and testing of countermeasures to protect deployed U.S. troops from infectious diseases and transfer knowledge and technology to our Peruvian hosts.

NMRC Positioned Under the Umbrella of Navy Medicine West

Story courtesy of Navy Medicine West and Naval Medical Research Center Public Affairs



SAN DIEGO – As part of the Bureau of Medicine and Surgery's (BUMED) effort to streamline decision-making and business planning processes at the headquarters and improve efficiency across all of Navy Medicine, organizational changes are being implemented at BUMED and the regional level. The Naval Medical Research Center (NMRC) and subordinate commands came under the umbrella of Navy Medicine West (NMW), August 1, 2015.

Reporting relationships and some elements of daily activities may change for personnel at NMW and NMRC headquarters. For the majority of personnel throughout the enterprise, the realignment will not impact their day-to-day work. As these changes are integrated over the next several months the new organization will become more responsive to NMRC's mission and overall the enterprise will become more efficient.

"Navy Medicine, as a business organization, is adapting to changes in the military health system as a whole," said NMW Commander, Rear Adm. Bruce L. Gillingham. "The Military Health System has been undergoing major transformations, and we have



seen the establishment of the Defense Health Agency in recent years. Add to that personnel and fiscal constraints, and that's a lot to deal with."

In adjusting to these significant changes, BUMED conducted a serious review of the headquarters and regional organizations, and established a business model that would allow for more flexibility and efficiency in a changing business environment. BUMED coined the term, *Reinvention*, to illustrate these efforts.

The *Reinvention* started in the fall of 2013, when the Surgeon General of the Navy began an evaluation of BUMED's organizational model, internal functions and governance structure. The results are a new structure for BUMED that focuses on total force, business operations, and healthcare operations that started July 1, 2015.

"It is important to understand that *Reinvention* is a process, not a quick fix that will be complete by August 1," said Gillingham, adding that ongoing initiatives focusing on improving organizational effectiveness and optimizing business processes are all part of BUMED reinventing itself to be a more effective organization. "I look forward to getting to know the

research enterprise and supporting your efforts to improve the operational readiness and overall health of our warfighters."

For NMRC the realignment will result in more streamlined operations and fewer reporting chains.

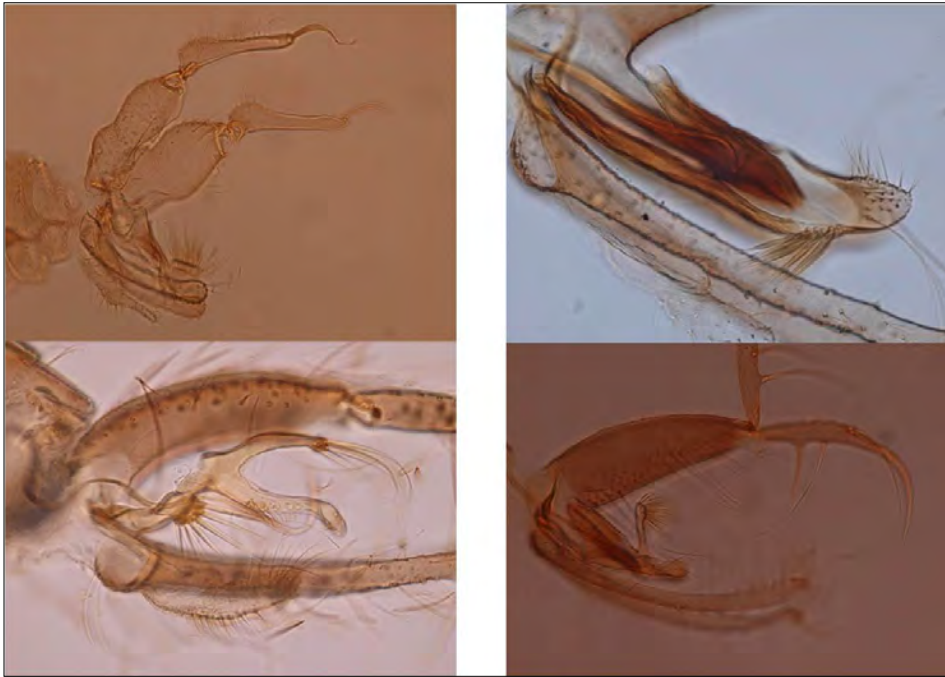
"I have been part of NMW for much of my career, prior to entering the R&D enterprise as Commanding Officer of the Naval Health Research Center, and now as Commanding Officer of the Naval Medical Research Center," said Capt. Jacqueline D. Rychnovsky. "It is natural to be uncomfortable with change and staff probably wonder what this will mean for NMRC. I can tell you, Rear Admiral Gillingham is very excited about what we do in R&D to support our warfighters. As we become part of the NMW family, I believe we will see our business process become more seamless and quicker, and more importantly, we will have increased advocacy promoting the research we do. The results will be beneficial to all of the labs."

There is consensus among Navy Medicine leadership that the *Reinvention* is more than an organizational change at the higher echelons of Navy Medicine, it is about establishing an adaptive business model that is responsive to current events and anticipates changes in an evolving world.

For more information about the *Reinvention* check out BUMED's *Reinvention* page, which can be accessed by clicking on the CAC-enabled Internal Sites link on their homepage at: www.med.navy.mil.

New Sand Fly Species and Potential Vector of Leishmaniasis Discovered by Navy Entomologist

This article was originally published by Entomology Today (www.entomologytoday.org) republished with permission.



The new species of sand fly was collected during an ecological study of arbovirus vectors in Peru, and is described in an article published in the *Journal of Medical Entomology*. The new species was given the name *Lutzomyia nautaensis*. It is named after Nauta, a village located at the origin of the Amazon River. (Photo courtesy of NAMRU-6 Public Affairs)

LIMA, Peru - A team of U.S. Navy entomologists has discovered a new species of sand fly in Peru. These flies are tiny, but some of them pack a big punch — they're known vectors of leishmaniasis, a disease that attacks both animals and humans.

The new species of sand fly was collected during an ecological study of arbovirus vectors in Peru, and is described in an article published in the *Journal of Medical Entomology*. The new species was given the name *Lutzomyia nautaensis*. It is named after Nauta, a village located at the origin of the Amazon River.

Lieutenant Commander Dr. Craig Stoops, the public affairs officer of Naval Medical Research Unit 6, the research unit that discovered the new species, noted that leishmaniasis is a prevalent disease in the region of Peru where the sand fly was discovered.

"Leishmaniasis is a serious health concern for the local population," said Stoops.

Cutaneous leishmaniasis is one of the most common forms that affect humans. It presents itself through skin lesions and ulcers, with an estimated 0.7 million to 1.2 million cases per year, according to the U.S. Centers for Disease Control and Prevention. A particularly nasty strain called visceral leishmaniasis results in 22,000 deaths annually, according to the World Health Organization.

"In this region of Peru," the researchers wrote, "cutaneous leishmaniasis is transmitted primarily by anthropophilic sand flies; however, zoophilic sand flies of the subgenus *Trichophoromyia* may also be incriminated in disease transmission. Detection of *Leishmania* spp. in *Lutzomyia auraensis* captured in the southern Peruvian Amazon indicates the potential of this and other zoophilic sand flies for human disease transmission, particularly in areas undergoing urban development."

In addition to the new species described in the paper, the researchers also reported

three new undescribed species and identified three other sand fly species that are new records for the area in their study.

These types of studies are common for Navy entomologists, who are tasked with researching harmful insects in order to better protect military troops from diseases.

"The main role for Navy Entomologists is to protect Sailors and Marines from malaria, arboviruses, and any insect-borne pathogen that may threaten the health of Department of the Navy personnel in the United States and abroad," said Stoops. "We work very closely with our colleagues in the Army, Air Force, and Department of Defense civilian personnel to provide protection for everyone in the Department of Defense regardless of branch of service. We serve as subject-matter experts overseeing both large- and small-scale vector-control programs anywhere we are asked to do so. Tightly tied to our direct public health mission, we conduct research on novel ways to control insect vectors and also their bionomics, distribution, and taxonomy to have the best tools to carry out our preventive medicine programs."

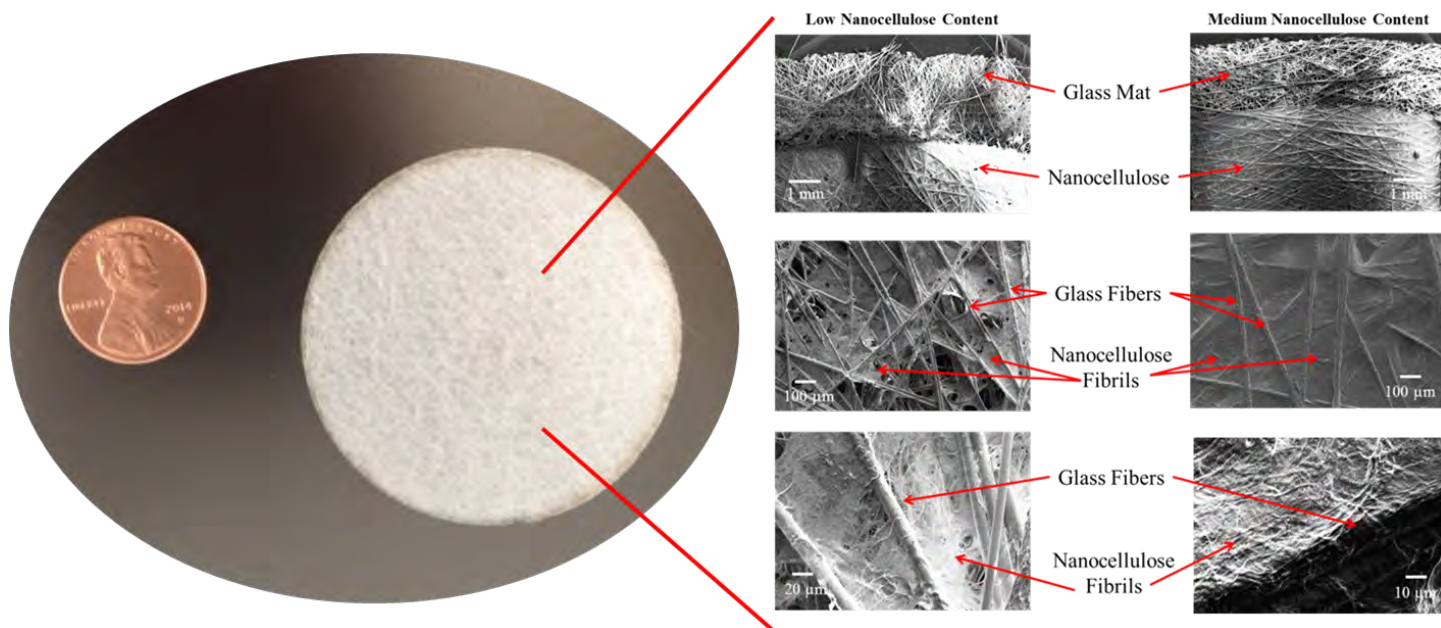
In fact, the Navy has been employing entomologists since World War II, with 38 active entomologists, seven reserve entomologists, and numerous civilian employees currently stationed across the United States and in Egypt and Peru.

In the Amazon region of Peru where *L. nautaensis* was found, researchers are confident that more novel findings are on the horizon.

"The diversity of *Lutzomyia* is always fascinating," said Stoops. "*L. nautaensis* is from one of the most biodiverse areas on Earth, so there are many amazing and interesting discoveries yet to be made."

NAMRU-SA Re-designs Chairsides Dental Filter

Story by Amber M. Nagy, Ph.D., NAMRU-SA



Nanocellulose 47mm diameter mat. To develop an amalgam separator that meets the proposed regulation standard, NAMRU-SA scientists created a two-step approach in designing the new filter material. The first phase will form a filter medium comprised of glass fibers interwoven with nano-structured cellulose. Inset is scanning electron microscope pictures detailing the medium's topography containing low (left) or medium (right) nanocellulose content. (Photo courtesy of NAMRU-SA Public Affairs)

SAN ANTONIO - Although dental amalgam used to fill cavities by Navy dentists is a safe, durable dental restoration material it does contain mercury and metal alloys that raise environmental concerns.

It is the biological and chemical conversion of mercury into methyl mercury (a potent toxicant) that can bioaccumulate in fish and aquatic wildlife with release of amalgam dental waste into publically owned wastewater streams.

Navy researchers are aggressively investigating novel, more efficient dental wastewater management technologies in advance of the Environmental Protection Agency's (EPA) new dental effluent guidelines.

In a proactive effort to ensure excellence in environmental stewardship, the Navy has formally mandated the use of chairside dental amalgam separators for years, well ahead of the new guidelines.

While the Navy ensures the dental amalgam separator devices used in dental treatment facilities (DTFs) are 95 percent efficient and comply with the International

Organization for Standardization (ISO) testing, it is anticipated that DTFs will be required to install amalgam separators that reduce emissions entering publically owned wastewater streams by 99 percent.

Researchers from the Naval Medical Research Unit - San Antonio's (NAMRU-SA) Environmental Surveillance Program and Dr. Michael Daniele and Dr. Joyce Breger from the Naval Research Laboratory's Center for Bio/Molecular Science and Engineering in Washington, D.C. began a collaboration to re-design amalgam separators.

These efforts began with introducing nanocellulose to the current filter design. Nanocellulose provides an inert nanofibrous matrix structure which is amenable to chemical modifications allowing for functional customization. It also has the advantage of being durable and is a sustainable resource.

Functionalization of this enhanced material will allow the nanocellulose to form a more complex filter matrix which will actively bond heavy metals, removing them from the waste water and retaining them within the filter matrix. If successful, this approach will not

only remove metal contaminants, but also be effective against Bisphenol A (BPA).

To develop an amalgam separator that meets the proposed guidelines, a two-step approach is being utilized in designing the new filter material. The first phase will form a filter medium comprised of glass fibers interwoven with nano-structured cellulose.

The second phase will enhance the performance of the filter material by adding functional groups onto the nanocellulose fibers. Researchers propose functionalizing the nanocellulose filter matrix with thiol-groups to enhance the electrochemical attraction of metals with the filter medium. This functional filter medium is further processed into mats or cartridge unit constructs.

The NAMRU-SA environmental surveillance team is hopeful development and functionalization of nanocellulose as an alternative, biocompatible filtration strategy can be incorporated into other practical applications that enhance the health, safety, and operational readiness of Sailors and Marines.

Researchers Identify Model to Predict Successful Wound Healing

Story courtesy of Uniformed Services University of Health Sciences, reprinted with permission.

BETHESDA, Md. - Battlefield surgeons and civilian physicians could have a powerful new tool to help patients recover from traumatic injuries, including life-threatening wounds from explosions. By studying blood and tissue samples from patients, a team of military and civilian researchers have identified a model to predict the chances for successful wound healing in individual patients.

These predictions could help surgeons make critical, time-sensitive decisions, such as when to close a wound. Both premature and late closing can lead to serious complications for the patient.

The researchers' findings, "Lessons of War: Turning Data into Decisions," was published online July 17, 2015 in the journal *E-Biomedicine* (<http://dx.doi.org/10.1016/j.ebiom.2015.07.022>).

"This study demonstrates that it is not merely the physical destructive nature related to the mechanism of injury in wounds, but the (body's) resulting inflammatory response, that dictates wound outcome," says the senior author, Navy Capt. (Dr.) Eric Elster, professor and chair of the Department of Surgery at the Uniformed Services University of the Health Sciences and the Walter Reed National Military Medical Center. "In this study, we have also determined that this response is similar between military and civilian patients, which are critically important because it allows us to translate advances in military patients into civilian patients and the converse as well."

Elster and a team from the USU

Walter Reed Surgical Critical Care Initiative collected blood, tissue and serum samples from 73 patients who sustained 116 life-threatening combat wounds in Iraq or Afghanistan and analyzed biomarker data and clinical observation to predict the likelihood of wound failure.

The samples were taken prior to and during each surgical debridement (removal of dead or contaminated tissue) of the wound.

"We've long suspected that young, previously healthy patients who had sustained blast injuries have difficulty regulating their immune system," Navy Cmdr. (Dr.) Jonathan Forsberg, first author on this study, says. "By characterizing patterns of inflammation using computer-intensive methods, we are now able to estimate the probability of surgical complications before they occur."

Because of body armor, improved tactical combat casualty care and a robust tertiary care system, many service members in Iraq and Afghanistan survived severe wounds that, in past wars, would have been fatal.

But the severity of the injuries meant that "even highly experienced military surgeons had difficulty risk-stratifying their patients' wounds because the conventional manner of visually assessing wounds was inadequate," the authors wrote.

Using advanced computer analytic methods of the samples collected, the team was able to determine the presence of cytokines (proteins) that in turn could predict which patients would develop an inflammatory

response that would lead to local wound failure.

The result of such failure can include infection, amputation or death.

The result of the research is a decision-support tool to guide the timing of wound closure, although the paper noted that the process requires collection of numerous samples and advanced computer analysis, which would need to be carried out in a field hospital setting, not the front line of a battlefield.

In addition, a group of 18 critically injured civilian patients was evaluated to determine if similar inflammatory responses were observed. Preliminary findings were comparable, but the authors said that due to the small sample size, more patients would need to be studied.

If the study's results are further validated, "consistently applying this approach would improve surgical outcomes, allow trauma patients to spend less time in intensive care, and reduce health care costs," the authors concluded.

In addition to Elster and Forsberg, the authors were Drs. Benjamin Kyle Potter of USU and Walter Reed National Military Medical Center, Matthew Wagner of the Naval Medical Research Center, Andrew Vickers of Memorial Sloan-Kettering Cancer Center, Christopher Dente of Emory University, and Allan D. Kirk of Duke University Medical Center.

A Few Words from a Navy Medicine Research Dentist

Blog by Capt. Jonathan M. Stahl, NAMRU-San Antonio



NAMRU-SA Principal Investigator and head of NAMRU-SA's Maxillofacial Injury and Disease Dept., Capt. Jonathan M. Stahl, DC, U.S. Navy. (Photo courtesy of NAMRU-SA Public Affairs)

SAN ANTONIO - Just over twenty years ago as a new Dental Officer on my first tour in the Navy I remember my Department Head helping to guide me through a particularly challenging dental procedure on a retired Marine. Shortly after the patient left the clinic my mentor said to me that this particular patient should not be thanking us, we should be thanking him. As the story unfolds, the retiree was a WWII veteran who saw action on both Iwo Jima and Okinawa. That particular event stuck with me over the years as a reminder of the special trust granted to me as a healthcare provider in the armed forces.

I began the process of joining the Navy after talking with a recruiter who visited Northwestern University Dental School in Chicago when I was a third year student. A few years in the Navy after dental school seemed like the ideal first job for me as it offered a sense of adventure and unique experiences not to be found in the private sector. I figured as a Navy dentist I would

have opportunities to see a little bit of the world, enhance my clinical skills and possibly be selected for post graduate opportunities available to Navy Dental Officers if I was willing to stay in for a little while longer. I did not initially plan on making the military a career, but could not imagine a more fulfilling career to be had at this point.

As a young dentist I had diverse assignments including serving with the Marines in Japan, a tour on an aircraft carrier, and assignment in Iceland for several years. Through my early tours I focused on honing my clinical skills and learning the art of being an effective leader. There were times when I was not sure which was the greater challenge, but over time opportunities to excel in both areas came knocking at my door.

My interest in research was sparked by my exposure to research when assigned to residency training in operative dentistry

at Indiana University. The Navy sent me to the University of California, San Francisco, to complete a doctorate in craniofacial research which was an opportunity not even remotely on my radar when I entered the service.

At present I serve as a full-time biomedical researcher at the Naval Medical Research Unit - San Antonio (NAMRU-SA). Navy dentists have a long tradition of utilizing research to improve the health of service members dating back to 1947 when the first dental research facility was established at Great Lakes.

What is most exciting about research is that moment, where after spending countless tedious hours in the lab, you make a discovery that adds to the greater wealth of scientific knowledge and has the potential to benefit many others in a tangible way.

NAMRU-SA is an extremely exciting place to work with a talented staff at the forefront of healthcare research with a focus on maintaining a high level operational readiness among Sailors and Marines.

Current research projects at NAMRU-SA are aimed at having a positive impact on the health and readiness of Sailors and Marines through treatment, detection, and prevention of craniofacial disease and injuries. Ongoing projects include efforts to create novel dental resins to prevent decay around fillings through the incorporation of titanium nanoparticles, to create nanofibrous wound dressings to enhance healing and reduce facial scar formation, and to develop a new treatments for multidrug resistant maxillofacial infections, among many others.

I have been fortunate to work with so many individuals in the Navy, enlisted and officers as well as civilians who serve alongside us. Many of those individuals have guided me on the path to where I am today. Most importantly, I have never forgotten that sacred trust that as a Dental Corps Officer I have when it comes to taking care of Sailors and Marines.

NAMRU-3 Joins Together for Annual Iftar Meal

Story by Ms. Sandra Boulis, NAMRU-3



CAIRO - Ramadan is observed annually on the ninth month of the Islamic lunar calendar. During this time, Muslims around the world abstain from food, drink, and other physical needs over the daylight hours.

However, Ramadan is much more than refraining from eating and drinking. It is actually a time for the faithful to practice self-sacrifice and refocus attention on God. Iftar, which translates to “break fast”, is the evening meal during, which Muslims end the fast at sunset in community with friends and family.

Representing all faiths, NAMRU-3 employees celebrate Iftar each Ramadan. Organized by the Local

Employee Committee, this year team members set up tables and brought out food and drink as the heat of the day faded on the evening of 12 July.

When the call for evening prayer echoed across the NAMRU-3 compound, NAMRU-3 Commanding Officer, Capt. John Gilstad, NAMRU-3 staff and family members sat down to enjoy traditional Iftar cuisine such as dates and Mahshi Wara’ Enab (grape leaves stuffed with rice and ground beef) while drinking hibiscus and tamarind juice.

The celebration was heightened by a folk show which consisted of four performers dressed in “the galabiaya” or traditional flowing robes. Live music

played by the tabla (drums), mozmar (pipe), and sagat (symbols) resounded as the celebrants, lead by two tanoura dancers regaled in large decorative skirts festooned with lights, whirled around the tables. When the show ended, children enjoyed face painting provided by Ms. Mireille Kamel.

The perfect ending of the night, back by popular demand, was the “zalabia cart” which offered a pastry best described as donut balls flavored with honey, chocolate or caramel.

As cleanup crews moved in, Gilstad remarked that the annual Iftar celebration is just one of the many great opportunities that serving at the OCONUS laboratories presents.

NMRC NREIP and SEAP Summer Interns Ceremony

Story and Photos by Mikelle D. Smith, Naval Medical Research Center Public Affairs

SILVER SPRING, Md. - Naval Medical Research Center (NMRC), along with Walter Reed Army Institute of Research (WRAIR) researchers held a recognition ceremony for summer interns participating in the Naval Research Enterprise Internship Program (NREIP) and the Science and Engineering Apprenticeship Program (SEAP), Aug 6.

For the past 10-weeks, NMRC researchers have mentored the interns in a variety of science-related areas across numerous topics. NREIP and SEAP interns presented research projects in the form of poster presentations during the ceremony. Mentors, which included a mixture of NMRC military officer and government employees, supported their interns during the event, and shared in the festivities with family and friends.

"I look forward to having the interns here every year," said NMRC Science, Technology, Engineering and Mathematics (STEM) Coordinator, Lt. Kimberly Edgel. "The mentors who volunteer

every year, the parents and supporters that get the interns here every day, truly make a difference in this process, and everyone involved makes this internship possible. These students are some of the best and brightest I have ever seen and I know they will do well in pursuit of science-related careers."

At the end of the ceremony, interns were given awards from the NMRC Executive Officer, Capt. Eric Hall, as well as received recognition with their mentor.

"Every summer we have the students here and they bring new ideas and a new life to the hallways of NMRC," said Hall. "It really is wonderful being able to see the next generation of scientists, doctors and researchers learn from some of the military's most dedicated ... I can't wait until next year."

NREIP and SEAP programs are supported by the Department of the Navy (DoN) and the Office of Naval Research (ONR).



NAMRU-Dayton Interns Participate in Aeromedical Directorate and IT Program

Story courtesy of NAMRU-Dayton Public Affairs



(Left to right) NAMRU-Dayton Summer Interns Ms. Stephanie Roberts, Ms. Katie Mack and Mr. Kevin Lee. (Photos courtesy of NAMRU-Dayton Public Affairs)

DAYTON, Ohio - Naval Medical Research Unit Dayton (NAMRU-D) selected three qualified individuals to participate in a paid summer internship through Oak Ridge Institute for Science and Education (ORISE). Interns reported in May 2015 and are now finishing up their last weeks with the command.

Information Technology Intern, Ms. Stephanie Roberts, returned for her second summer to continue under the supervision of a NAMRU-D IT specialist.

"I wish to further my knowledge in computer engineering and hardware," said Roberts.

Round two had her meticulously updating the command's computer assets list and updating antivirus software on laboratory machines. In an effort to enhance researcher's ability to maintain a secure commercial connection and analyze gathered research data, Roberts prepared computers to receive the Defense Research Engineering Network image and applied her understanding of the functionality of new Cisco switches.

The experience, "will help her immensely

during her next year of study that will include routers and switches," said her IT Specialist mentor.

Aeromedical interns, Mr. Kevin Lee and Ms. Katie Mack, were assigned to support multiple research projects such as hypoxia, fatigue, vision sciences, spatial disorientation, and motion sickness.

"I loved learning about the vision sciences [and] how the eye perceives color and the differences between those with normal vision and those with color deficiencies. I had a slight interest in optometry before, but this really re-sparked my interest!" said Mack. The two science interns witnessed an in motion hypoxia study and a motion sickness countermeasure investigation, which familiarized them with the in-theater applications for each research area.

In addition to scientific investigation, Lee and Mack worked with the Public Affairs Officer to research historical documents (i.e., photographs, interviews, and scientific publications) over the 5-year history of NAMRU-D and more than 70 years of legacy aeromedical research to support a command history book initiative, which will cover the

origins of aeromedical and environmental health effects science in Navy Medicine.

Lee provided support to a spatial disorientation simulation project while applying his knowledge of mathematics and programming to develop a realistic, dynamic representation of a suspended wire for a "high wire illusion" scenario, which substantially enhanced the quality of the research project.

"I never realized how much math is actually required for [spatial disorientation] simulation," said Lee. "It takes a team of several people with different specialties to create a simulator. One person can do a lot. Many people can do a lot more."

Although August arrived quickly, each intern was more than able to support the NAMRU-D mission and accomplish various tasks in their short time here. Their NAMRU-D experience proved to be meaningful with practical application and confirmation of their chosen areas of study and ultimate career path.

R&D Chronicles

The Beholders of the Prosthetic Eyes: Navy Medicine and the Development of the Acrylic Eye

By Andre B. Sobocinski, Historian, Bureau of Medicine and Surgery

"It's an eye for an eye. The New eye is not flesh and it has no ability to see—but no one glancing at it would ever suspect that."

~James Nevins Miller, *Mechanix Illustrated Magazine*, June 1946

The year is 1944. At Naval Hospital Bethesda, Maryland, medical personnel are no longer able to procure glass eyes for wounded veterans.

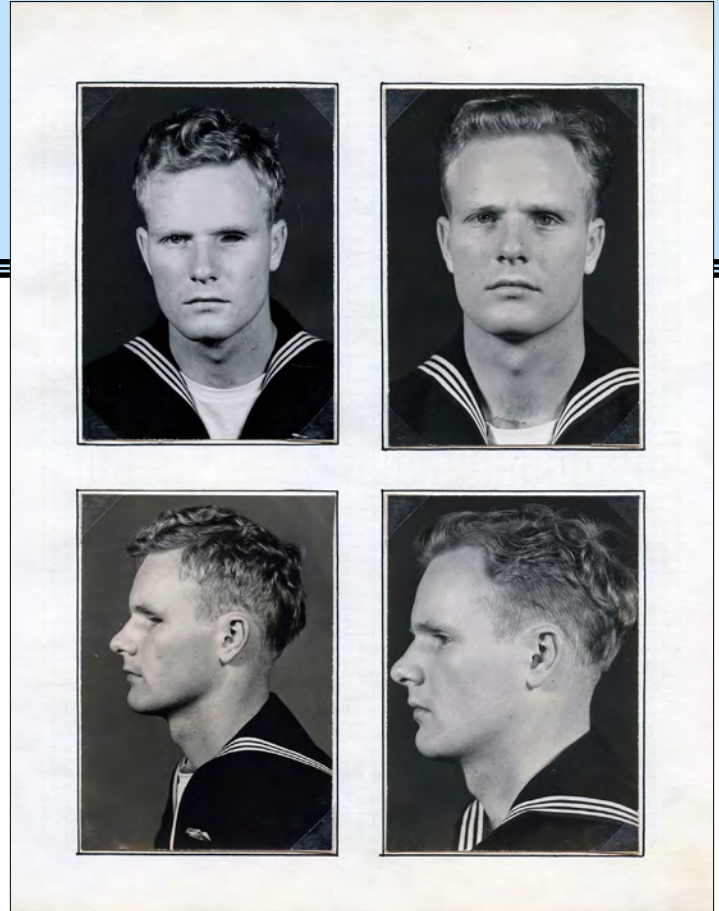
Hearing about new advances in ocular prosthetics, the hospital's Chief of the Ear, Nose and Throat Department asks researchers at the Navy Dental School to explore a solution to the glass eye shortage. Within the year, three Navy dentists and a medical illustrator would develop a process for fabricating acrylic eyes and forever revolutionize the field of prosthetics.

Since the 19th century German artisans in the state of Thuringia were considered the unrequited masters of the artificial glass eye fabrication; their craftsmanship was so unparalleled that at the beginning of World War II almost all of the artificial eyes in the United States came from the same place, Thuringia. The war would interrupt this steady supply and set the stage for Navy dentists Capt. Rae Pitton, Lt. Cmdr. Phelps Murphey, Lt. Cmdr. LaMar Harris and medical illustrator Lt. Cmdr. Leon Schlossberg, Hospital Corps.

Owing to their extensive knowledge of impression methods, plastic materials, anatomy of the head and esthetic appearance of the face it was logical that dentists and an illustrator became involved in the research. The acrylic eye was fabricated much like a denture base.

The dentists would make an impression of the eye socket using an alginate or hyper colloid molding. Once the impression was removed, a stone working cast was poured over the impression.

The working cast was removed from the impression, lubricated and a plaster was poured over it. The cast was cut vertically to allow removal of a wax pattern. The pattern/model was then smoothed, dropped in ice water, removed, and lubricated with liquid petroleum before trying out in the eye socket. The dentist fitting the eye would then study the lid reaction and profile view to ensure that it mimicked the contour of the uninjured side.



A Navy Sailor before and after being fitted with the acrylic prosthetic eye, ca. 1944. (Photo courtesy of BUMED Historian)

If deemed satisfactory, the model was duplicated with acrylic material.

After the prosthetic was fabricated, the medical illustrator was then tasked with painting the eye—complete with sclera, blood vessels and iris—to ensure it was an exact replica of the patient's existing eye.

Unlike its glass counterpart, the acrylic eye was very durable, and could be adapted to utilize the remaining eye muscles. It also afforded maximum comfort to the patients. And unlike the glass eye, each acrylic prosthetic was specially fitted for the patient.

In November 1944, the Naval Dental School instituted a 6-week course of instruction to teach dental officers this technique.

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NMRC Medical Service Corps Officers Celebrate 68 Years

Photos and Graphic Illustration by Mikelle D. Smith, Naval Medical Research Center Public Affairs



Medical Service Corps (MSC) officers assigned to Naval Medical Research Center (NMRC) celebrated the 68th birthday of MSC, Aug 4. The celebration included a history of MSC from Lt. LaToya Thompson, who coordinated the event, as well as a traditional cake cutting by the youngest and oldest MSC officers.



Naval Medical Research Center could like to wish the U.S. Navy Medical Service Corps
Happy 68th Birthday, August 4, 2015!
Thank you to all the MSC officers for your service and dedication to the Navy.



Five Boats Compete in Ledyard's First Cardboard Regatta

Story by Lindsay Boyle, *The Day*



Zach Hanna of Ledyard does his best to paddle back to shore after his cardboard boat, *The Bumblebee*, began to take on water during the Cardboard Regatta at Highlands Lake in Ledyard, Sunday, August 2, 2015. (Tali Greener/Special to *The Day*)

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Ledyard — Interns of varying ages from the Naval Submarine Medical Research Laboratory and community members learned an important lesson on Sunday: Simplicity often trumps flashiness.

In the first “cardboard regatta” sponsored by Ledyard Public Libraries and hosted on Highlands Lake, high school, college and graduate students took turns setting out in their handmade, cardboard-and-duct-tape boats. They were seeking titles in agility, speed and tonnage, or their boat’s ability to bear weight.

Of the five competing boats, three, some of which looked much like one would expect a canoe to look, failed to launch in their first and sometimes second attempts. Only the two widest boats, each with a flat bottom and pointed front, had few to no issues.

Michael “Q” Qin, principal investigator at the research laboratory, said the result was not surprising.

“We’ve been trying to promote STEM (science, technology, engineering and mathematics) in the Navy for some time,” Qin said. “What we’ve found over the last few years is our high school students, while brilliant on the books, might lack some of the hands-on skills.”

He pointed to standardized testing as one possible reason for the change.

“It’s one thing to know about buoyancy, but it’s another to see it in practice,” Qin said. “While they’re building these boats, as you can see, there are little things that they don’t think of ... when it’s been reduced to theory.”

“I’m hoping that this is something we can continue into the future,” he added.

Of the Naval Submarine Medical Research Laboratory interns competing, three were in high school, two were aiming for undergraduate degrees and

one was a graduate student.

Competitors came from Greenwich Academy, East Lyme High School, Syosset High School, George Washington University, Rhode Island School of Design and the University of Connecticut.

One couple, Gretchen Edstrom and David Burnside, were in attendance with their dog to watch Edstrom’s daughter, intern Emmy Franklin of Rhode Island School of Design, row one of the boats. It was the first time both of them had seen such a competition.

“We’ve gotten to know the interns all summer long, and it’s been really fun,” Edstrom said, explaining that she has had the group over to her house for pizza. “It’s more than just an internship where you go to work. It’s been a bonding thing.”

Two participants, however, simply were community members — likely a result of Ledyard Public Libraries’ sponsorship of the event.

The regatta is just one of several events the library group has sponsored since launching a series of “maker programs” a few months ago, Maker Program Coordinator Andrea Buka said.

From the manufacturing of beeswax-based skin cream to antique radio restoration, the programs cover a wide range of topics, so long as something is being made that involves computers, technology, carpentry and/or the arts.

But, Buka, said despite the variety, all of the events carry a similar purpose.

“We want to get adults and older teens in hands-on workshops to learn new things and to share their skills with the community,” Buka said.

The Beholders of the Prosthetic Eyes: Navy Medicine and the Development of the Acrylic Eye

(continued from page 12)

Course graduates would be assigned to naval hospitals at Great Lakes, Illinois; Philadelphia, Pennsylvania; Seattle, Washington; San Diego, California; and St. Albans, New York.

The news of the Navy's acrylic eye caught the public's imagination so much so that the Bureau of Medicine and Surgery and the Naval Dental School were besieged with requests from people around the world for a chance to obtain an acrylic eye. The Navy Medicine's policy held that only individuals who were patients at naval hospitals would be authorized for fittings. Even military dependents were not immediately granted access. The only exceptions made were children of two Navy Sailors—a 9-month old born with an eye tumor and a 9-year old boy who lost an eye in an accident. Both were fitted with prosthetic eyes in 1946.

Due to the diminishing need for artificial eyes post-war, and the loss of the so called "iris illustrators" to demobilization, acrylic eye programs were ended at all naval facilities after May 15, 1946, except for the Naval Dental School, Naval Hospital Philadelphia, and Naval Hospital San Diego.

The acrylic eye would be the subject of two Navy training films, and one of its originators (Dr. Phelps Murphey) would travel around the world teaching the technique to other nations. Today, the acrylic eye is still commonly used as an ocular prosthetic.



Lt. Cmdr. (later Capt.) Phelps Murphey, DC, USNR, is credited as one of the fathers of the acrylic prosthetic eye. Murphey had been a practicing civilian dentist in Dallas, Texas for 18 years before coming to the Navy Dental School where he would serve as the Officer in Charge of Research. At the end of the war, Murphey would lead the effort to teach others how to produce the acrylic eye. (Photo courtesy of BUMED Historian)

NMRC would like to wish the U.S. Navy Dental Corps Happy 103rd Birthday!

August 22, 2015



Graphic Illustration by Mikel D. Smith, Naval Medical Research Center Public Affairs